OBSERVATIONS ON THE BIOLOGY OF THE LEECH *PHILOBDELLA GRACILE* MOORE IN SOUTHEASTERN LOUISIANA

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In Louisiana *Philobdella gracile* is found almost exclusively in the cypress and tupelo swamps and freshwater marshes. It also occurs in the bayous, canals, and ditches that are the natural or artificial drainage channels of these regions. As *P. gracile* does not remain permanently associated with its hosts (or, victims), observations in the field are difficult unless numbers of the hosts are handled. The water where this species occurs is generally of a dark or reddish-brown transparency, hence these black leeches when swimming or stationary are difficult to see. The following notes are the result of an accumulation of observations and experiences extending over a period of about ten years.

Hosts.—Individuals of this species have been taken by the writer attached to or feeding on quite a number of amphibians and reptiles, including the frogs *Rana catesbeiana, R. grylio, R. clamitans*, and *R. pipiens*, the alligator, the water snakes *Ancistrodon piscivorous, Natrix cyclopion*, and *N. sipedon fasciatus*, and the turtles *Chelyrda serpentina* and *Kinosternon subrubrum hippocrepis*. This does not mean that this leech shows a preference for the species named above; these animals are the most abundant members of the aquatic society with which this leech is associated in southeastern Louisiana. If preference is shown at all it is for the bullfrog, *Rana catesbeiana*. This may be more apparent than real, however, the writer having caught, purchased, or otherwise handled greater numbers of bullfrogs than any other of the leech's hosts in the early spring when the leeches come out of hibernation and show their greatest appetite.

The greatest harm done by this leech is the destruction of large quantities of frog eggs. The eggs of *Rana pipiens* suffer in particular because they are the first to be laid in the spring. I have made no observations that would show that this leech feeds on fishes, or on invertebrate animals other than perhaps water snails and certain crawfish. On several occasions while digging in the bottoms of dry sloughs and ditches near Pearl River (St. Tammany Parish, La.) I found specimens of this leech in the shallow burrows of the dwarf crawfish *Cambarellus shufeldti*. In each instance that a leech was found there was a dead crawfish in the same burrow. This suggests at least that the leech had fed on the crawfish; however, I have never seen a leech attached to a crawfish.

These leeches, if carefully looked for, sometimes may be found in the mud or under logs at the edge of bodies of water. When not feeding or swimming usually they are buried in the mud at the bottom of shallow swamps, marshy ponds, and other aquatic habitats. If one wades with bare legs in places where they occur, only a few individuals will attach to the legs unless the mud is vigorously stirred with the feet or sticks, when every leech within the immediate area may be induced to attach to one's legs. Yet, never has one leech actually taken or attempted to take blood from the writer, or in fact to my knowledge from any other human being. I think that if they did, this would be a well known fact as hunters, trappers, moss pickers, fishermen, and crawfish netters are constantly exposed to them; and, the public has a tendency to exaggerate rather than suppress facts.

From boyhood I had been under the impression that these leeches lived on the blood of cows, but would not bite human beings. During that time many of the New Orleans dairies were located at the borders of the swamps where land was cheap. Here, during wet spells or high water, marshy meadows were formed. In such places the leeches were abundant, but I do not recollect whether I actually found them attached to the legs of the cattle. Certainly I did not observe them taking blood. There may have been no relation of their abundance to the presence of cattle, except perhaps that the mud was kept slushy and afforded them excellent places for concealment. Most of these dairy lands have now been reclaimed so I have had little opportunity to make further observations on this point in recent years.

[1] This brief note was written in 1922 and is published posthumously. Editor.

Habits.—Normally, during the day, these leeches are buried in the soft alluvium under or at the edge of the water. At night they may be found in the water on top of the mud or swimming, but they are particularly abundant at the edge of the water where they often rest with the anterior half out of water and the posterior below the surface; often they sway in this location with an undulating motion. If they are in a current, their heads are upstream and their undulations assist the flow of the water. When a number of leeches are placed in a globular aquarium they may produce a current by their motions; eventually all leeches in the bowl face against the flow so that the water may continue to circulate in one direction for a considerable length of time due to the action of the leeches. During times of high water or heavy rain they leave the mud (day or night) and head against the currents; and, if currents are produced in a pond by wind action they will swim to and accumulate at the leeward shore. They will not descend to the bottom in deep water; thus, they are usually found in water about 6 to 18 inches deep as such places usually retain their water or sufficient moisture, to tide the leeches over an average summer drought. During hot weather they are active only at night; and, in moderate mild temperatures that occur in spring and autumn in this area, they may be active day or night.

Large specimens have been found in our concrete frog pens (Southern Biological Supply Co.) where they evidently had been since late summer, we having obtained no frogs between October and March when the leeches were removed from the pens. The leeches must have been small and thus unnoticed or they would have been removed when the frogs were counted into the pens. This would suggest a rather rapid rate of growth under favorable conditions.